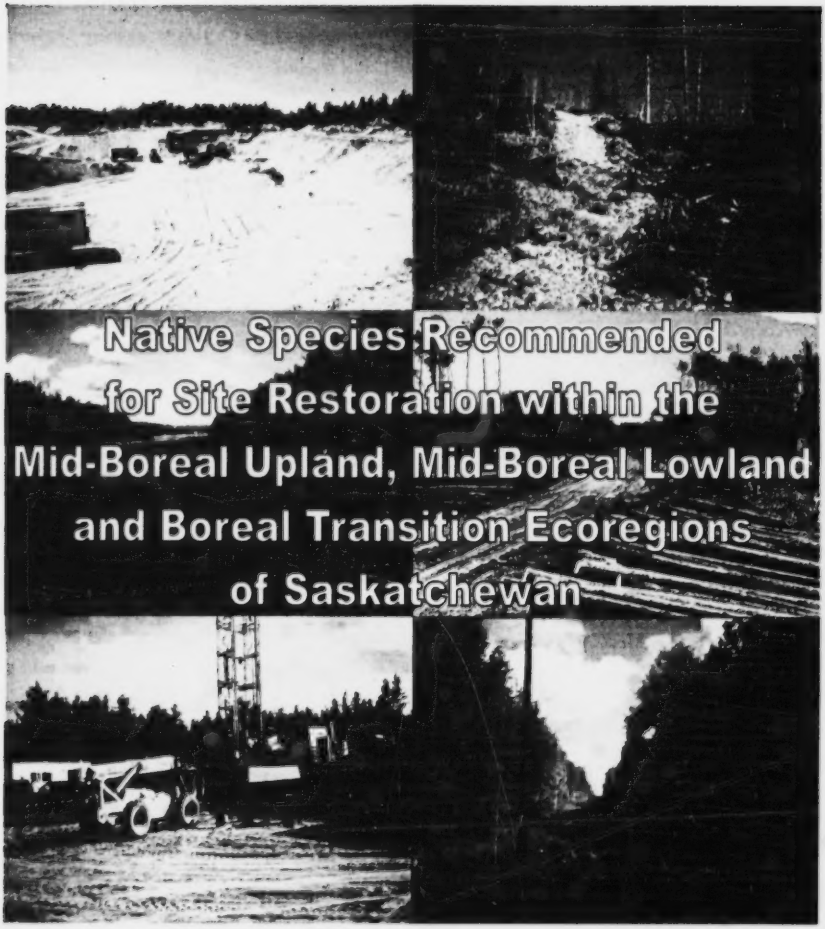

Native Species Recommended for Site Restoration within the Mid-Boreal Upland, Mid-Boreal Lowland and Boreal Transition Ecoregions of Saskatchewan

Saskatchewan Environment

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DEDICATION

This publication is dedicated to the memory of Wayne Harris, who tragically passed away on October 7, 2002.

As an employee of the Department of Environment for 13 years, Wayne was a special person with breadth and depth in a variety of resource disciplines. He had a passion for raptors, and banding young Ferruginous and Swainson's hawks became part of his job. He went the extra mile to obtain information on endangered species, putting in long and grueling field days followed by early morning and late night hours in the office, documenting information and networking with others to advance the protection of Saskatchewan's biodiversity. Wayne co-operated with the oil and gas industry to determine methods, which allowed for development, while minimizing impacts on the wildlife resource, particularly native vegetation. He recognized the importance of reducing the impacts of exotic species, to the extent that he made a personal effort to remove Japanese brome from pastures in the southwest corner of the province.

As a respected and prominent ecologist, Wayne authored and co-authored numerous publications within and outside government. Some of his written work includes a pioneer effort in preparing a description of understory vegetation within various forest ecosystems.

His dedicated and professional ethic is acknowledged. His caring for the environment and contributions of time and knowledge remain a legacy.

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This report is a collaborative effort between government and non-government participants. It has been prepared as a practical guide to assist in the use of native species for rehabilitating disturbed areas. Saskatchewan Environment staff leading preparation of the report includes: Adam Kosowan, Jim R. Smith, Rob Wright, Ann Gerry, Sheila Lamont and Bob Wilson.

Thanks are extended to Dr. Jim Romo, Professor, University of Saskatchewan and the students from the Landscape Ecology and Vegetation Management Class (John Conkin, Sherry Stewart, Jennifer Fernet, Andrew Pantel, Neil Block, Tara Sample, Debbie Borowsky and Tim L'Arrivee). The student papers provided a basis for this report.

The project was further advanced by Joel Ulmer, a summer student with Saskatchewan Environment, who synthesized the student reports. The work undertaken by Joel is appreciated.

The assistance provided by Dr. Vernon Harms, Professor *emeritus*, University of Saskatchewan and John H. Hudson, Botanist, with reviewing the report is gratefully acknowledged.

Thanks are also extended to Ron Erickson, Director, and Chris Dunn, Integrated Resource Manager, Prince Albert, for their administrative support, and to numerous other Saskatchewan Environment colleagues for their contributions.

INTRODUCTION

The maintenance of ecological structure, function and composition requires an understanding of natural ecosystems, and the corresponding application of that knowledge. Humans are unable to replicate pre-disturbance natural processes, but are able to minimize the impacts of man-made disturbances on the landscape and facilitate recovery toward a natural system.

Exotic species are recognized as a threat to the maintenance of natural biodiversity. Studies by Saskatchewan Environment have demonstrated that soil exposure provides a favorable location for the establishment of undesirable plant species. Early re-establishment of native species on disturbed sites is recommended for mitigation. The intent of this report is to serve as a practical guide for the selection of suitable native species to reclaim disturbances within the Mid-Boreal Upland, Mid-Boreal Lowland and Boreal Transition Ecoregions (Figure 1).

As disturbances generally result in habitats exposed to sunlight, the species listed are suitable for sunlight conditions. They are organized within the following site categories: dry, fresh, moist, wet and organic. Proportionally, it is suggested that the dry, fresh and moist site species mixes contain 80 to 90% grasses (and grass-like) and 10 to 20% forbs. The wet and organic site species should contain approximately 95% grasses (and grass-like) and the balance forbs. Four or more grass (and grass-like) species and four or more forb species should be used in the mix. To confirm proper species selection and locate rare species, proponents are encouraged to undertake vegetation surveys prior to development.

The species listings are based on ecological suitability without consideration to seed procurement (purchase or collection). It is suggested that users obtain additional information on species characteristics prior to purchasing seed and planting. Local origin seed with purity from weeds is recommended. Additional information sources are identified in this report.

The authors believe that this report is a useful starting point and encourage future efforts toward a better understanding of site and species relationships.

Figure 1. Mid-Boreal Upland, Mid-Boreal Lowland and Boreal Transition Ecoregions in Saskatchewan.

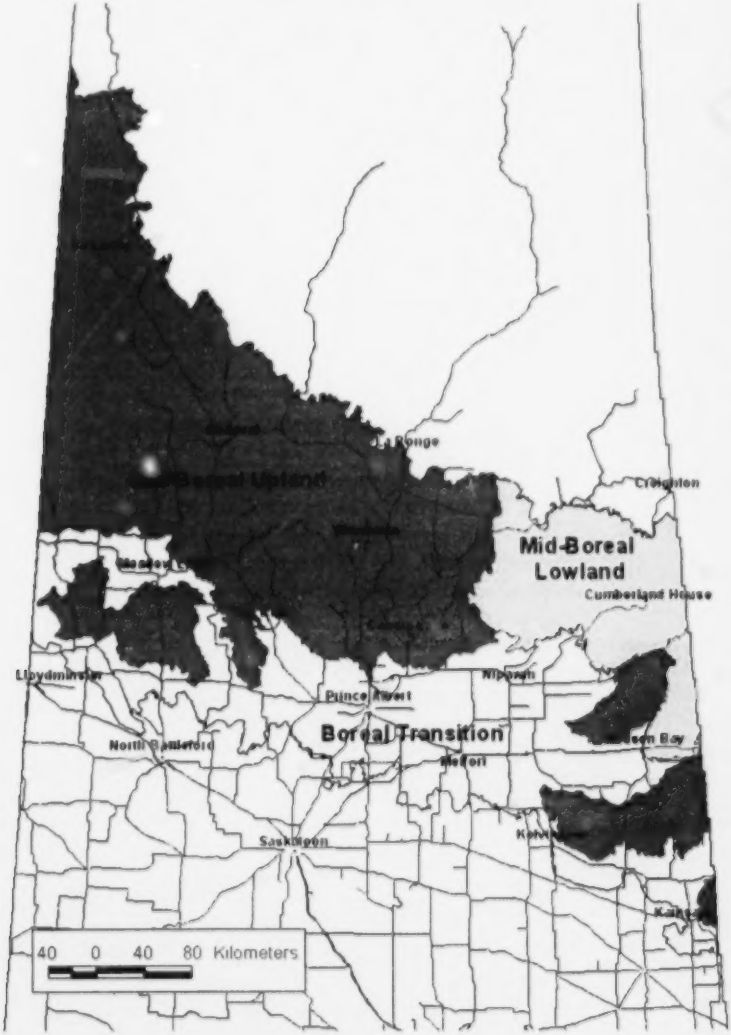

Figure 1. Mid-Boreal Upland, Mid-Boreal Lowland and Boreal Transition Ecoregions in Saskatchewan

SITE DEFINITIONS

Dry: Moisture and nutrient deficient sites, commonly supporting jack pine forests (rapidly drained sands). Examples include the Nisbet and Fort-à-la-Corne Provincial Forests. These are the driest sites supporting forest growth.

Fresh: These sites are commonly differentiated from the dry category by the presence of clay or silt in the soil profile. They are topographically located from the mid to upper slope positions. Coarse soils (sands) may also occur in this site category; however, they are topographically located on lower slopes where groundwater or runoff influences vegetation growth. A variety of boreal tree species may be found on these sites of average growing conditions.

Moist: Soils within this site category may be a variety of textures (sands, clays etc). Due to topography (mid-slope to depression), landscape (productive lowland) or other influence, more water is available for plant growth than in the previous categories. These are the most productive forest sites on which a variety of boreal forest species may be found.

Wet: These sites are seasonally saturated or located in areas with a higher water table. The soils may be a variety of textures (sands, clays etc.) and are usually overlain by a shallow layer of peat. These poorly drained sites are usually occupied by black spruce, white spruce and tamarack or may consist of meadows located in depressions.

Organic: Prolonged saturation and organic matter accumulation (> 40 cm) are characteristic of these sites. They are located in areas with a high water table and commonly termed bogs and fens. The bogs may contain a black spruce and/or tamarack forest cover; whereas, the dominant vegetation of fens are grasses and grass-like species.

SPECIES BY SITE TYPE – GRASSES, SEDGES AND RUSHES[1]

	SITE				
	DRY	FRESH	MOIST	WET	ORGANIC
alpine rush *(Juncus alpinus; Juncus alpinoarticulatus* ssp. *nodulosus*[2]*)*				■	
awned sedge *(Carex atherodes)*				■	■
awned wheat grass *(Agropyron subsecundum; Elymus trachycaulus* ssp. *subsecundus)*	■	■			
beaked sedge *(Carex utriculata)*				▨	▨
bog muhly *(Muhlenbergia glomerata)*				▨	
bog sedge *(Carex magellanica)*					■
common cattail *(Typha latifolia)*					▨
common great bulrush *(Scirpus lacustris* ssp. *validus; Schoenoplectus tabernaemontanus)*					▨
common reed grass *(Phragmites communis; Phragmites australis)*				▨	▨
common sweet grass *(Hierochloe odorata)*			■	■	
creeping spike-rush *(Eleocharis palustris)*				▨	■
Dudley's rush *(Juncus dudleyi)*				■	▨
fowl bluegrass *(Poa palustris)*			■	■	
fowl manna grass *(Glyceria striata)*				■	■
foxtail barley *(Hordeum jubatum)*		▨	▨		
fringed brome *(Bromus ciliatus)*		■	■		
great bulrush *(Scirpus lacustris* ssp. *acutus; Schoenoplectus acutus* var. *acutus)*					▨

[1] **Suitable species within each site type.**

■ Black shading identifies species for primary consideration. Others may be suitable.

▨ Gray shading identifies species for secondary consideration. Others may be suitable.

It is recommended that users further verify species/site suitability as soil characteristics such as acidity and salinity can influence species selection and survival. In addition, some species listed within the "organic" category are found in shallow water.

[2] The first Latin name has until recently been the accepted name and appears in books on vascular plants. The second is the currently accepted name available only in new or revised flora.

SPECIES BY SITE TYPE – GRASSES, SEDGES AND RUSHES

	SITE				
	DRY	FRESH	MOIST	WET	ORGANIC
hair-like sedge *(Carex capillaris)*					
hairy wild rye *(Elymus innovatus; Leymus innovatus)*					
inland blue grass *(Poa interior; Poa nemoralis* ssp. *interior)*					
June grass *(Koeleria macrantha)*					
knotted rush *(Juncus nodosus)*					
marsh reed grass *(Calamagrostis canadensis)*					
narrow reed grass *(Calamagrostis neglecta; Calamagrostis stricta* ssp. *stricta)*					
nodding brome *(Bromus anomalus; Bromus porteri)*					
northern brome *(Bromus pumpellianus; Bromus inermis* ssp. *pumpellianus)*					
northern manna grass *(Glyceria borealis)*					
northern reed grass *(Calamagrostis inexpansa; Calamagrostis stricta* ssp. *inexpansa)*					
northern rice grass *(Oryzopsis pungens; Piptatherum pungens)*					
plains rough fescue *(Festuca altaica* ssp. *hallii)*					
purple oat grass *(Schizachne purpurascens)*					
rocky mountain fescue *(Festuca saximontana)*					
rough hair grass *(Agrostis scabra)*					
russet cotton-grass *(Eriophorum chamissonis)*					
sheathed cotton-grass *(Eriophorum vaginatum* var. *vaginatum)*					
sheathed sedge *(Carex vaginata)*					

SPECIES BY SITE TYPE – GRASSES, SEDGES AND RUSHES

	SITE				
	DRY	FRESH	MOIST	WET	ORGANIC
slender cotton-grass *(Eriophorum gracile)*					
slender rush *(Juncus tenuis)*					
sand sedge *(Carex houghtoniana)*					
silvery-flowered sedge *(Carex aenea; Carex siccata)*					
slender wheat grass *(Agropyron trachycaulum; Elymus trachycaulus ssp. trachycaulus)*					
slough grass *(Beckmannia syzigachne)*					
small-fruited bulrush *(Scirpus microcarpus)*					
streambank wheatgrass *(Agropyron riparium; Elymus lanceolatus* var. *riparius)*					
tall cotton-grass *(Eriophorum angustifolium)*					
tall manna grass *(Glyceria grandis)*					
timber oat grass *(Danthonia intermedia)*					
thin-leaved cotton grass *(Eriophorum viridicarinatum)*					
tufted hair grass *(Deschampsia caespitosa)*					
two-stamened sedge *(Carex diandra)*					
water sedge *(Carex aquatilis)*					
white-grained mountain rice grass *(Oryzopsis asperifolia)*					
wire rush *(Juncus balticus)*					
yellow bog sedge *(Carex gynocrates)*					

SPECIES BY SITE TYPE – FORBS

	SITE				
	DRY	FRESH	MOIST	WET	ORGANIC
American dragonhead *(Dracocephalum parviflorum)*	■				
American vetch *(Vicia americana)*	■	■	■		
arrow-leaved coltsfoot *(Petasites sagittatus; Petasites frigidus* var. *sagittatus)*				■	■
arum-leaved arrowhead *(Sagittaria cuneata)*				■	■
balsam groundsel *(Senecio pauperculus; Packera paupercula)*			▒	▒	▒
Bicknell's geranium *(Geranium bicknellii)*	■	▒			
blue columbine *(Aquilegia brevistyla)*		▒			
broad-leaved pussytoes *(Antennaria neglecta)*		▒	▒		
bristly buttercup *(Ranunculus pensylvanicus)*				▒	▒
buck-bean *(Menyanthes trifoliata)*					■
bunchberry *(Cornus canadensis)*	▒	■	▒		
Canada anemone *(Anemone canadensis)*			▒	▒	
Canada goldenrod *(Solidago canadensis)*		■	■		
common harebell *(Campanula rotundifolia)*	▒	▒	▒		
common yarrow *(Achillea millefolium)*	■	■	■		
cow-parsnip *(Heracleum lanatum; Heracleum maximum)*			■	■	
cream-colored vetchling *(Lathyrus ochroleucus)*	▒	■	▒		
cut-leaved anemone *(Anemone multifida)*	■	■	■		
cut-leaved ragwort *(Senecio eremophilus)*			■		
early blue violet *(Viola adunca)*	▒	■	▒		
fireweed *(Epilobium angustifolium; Chamerion angustifolium)*	■	■	■		
Franklin's scorpionweed *(Phacelia franklinii)*	■				

SPECIES BY SITE TYPE – FORBS

	SITE				
	DRY	FRESH	MOIST	WET	ORGANIC
giant hyssop *(Agastache foeniculum)*			■		
golden dock *(Rumex maritimus)*				▒	
lapland buttercup *(Ranunculus lapponicus)*				▒	▒
Lindley's aster *(Aster ciliolatus; Symphyotrichum ciliolatum)*		■	■		
long-leaved starwort *(Stellaria longifolia)*			▒	▒	
long-stalked chickweed *(Stellaria longipes)*	▒	▒	▒		
Macoun's buttercup *(Ranunculus macounii)*			▒	▒	■
marsh aster *(Aster borealis; Symphyotrichum boreale)*					■
marsh hedge-nettle *(Stachys palustris* var. *pilosa; Stachys pilosa)*			■	■	▒
marsh ragwort *(Senecio congestus)*				▒	▒
marsh skullcap *(Scutellaria galericulata)*				▒	
mountain goldenrod *(Solidago spathulata; Solidago simplex* ssp. *simplex)*		▒	▒		
narrow-leaved dock *(Rumex salicifolius* var. *mexicanus)*			▒	▒	
narrow-leaved hawkweed *(Hieracium umbellatum)*		▒	▒		
northern bedstraw *(Galium boreale)*		■	■		
northern daisy fleabane *(Erigeron acris)*			■		
northern gentian *(Gentianella amarella* ssp. *acuta)*			▒		
northern valerian *(Valeriana dioica* var. *sylvatica)*			▒	▒	
palmate-leaved coltsfoot *(Petasites palmatus; Petasites frigidus* var. *palmatus)*		▒	▒	▒	
Philadelphia fleabane *(Erigeron philadelphicus)*			▒		
plains wormwood *(Artemisia campestris)*	■				
prairie crocus *(Anemone patens; Pulsatilla patens* ssp. *multifida)*	■				
purple peavine *(Lathyrus venosus)*		▒	▒		

SPECIES BY SITE TYPE – FORBS

	SITE				
	DRY	FRESH	MOIST	WET	ORGANIC
Richardson's alumroot *(Heuchera richardsonii)*	■				
seaside arrow-grass *(Triglochin maritima)*					
shore buttercup *(Ranunculus cymbalaria)*					
showy aster *(Aster conspicuus; Eurybia conspicua)*		■	■		
silverweed *(Potentilla anserina; Argentina anserina)*					
small bedstraw *(Galium trifidum)*					
small-leaved pussytoes *(Antennaria microphylla)*					
smooth fleabane *(Erigeron glabellus)*					
spreading dogbane *(Apocynum androsaemifolium)*	■	■			
star-flowered false solomon's-seal *(Smilacina stellata; Maianthemum stellatum)*					
sweet-scented bedstraw *(Galium triflorum)*					
tall bluebells *(Mertensia paniculata)*					
three-leaved false solomon's-seal *(Smilacina trifolia; Maianthemum trifolium)*					■
veiny meadow rue *(Thalictrum venulosum)*					
water parsnip *(Sium suave)*				■	
Western Canada violet *(Viola Canadensis* var. *rugulosa)*					
western dock *(Rumex occidentalis; Rumex aquaticus* var. *fenestratus)*					
western willow aster *(Aster hesperius; Symphyotrichum lanceolatum* ssp. *hesperium)*					
wild lily-of-the-valley *(Maianthemum canadense)*					
wild mint *(Mentha arvensis)*				■	
wild strawberry *(Fragaria virginiana)*					
woodland strawberry *(Fragaria vesca)*					
yellow marsh-marigold *(Caltha palustris)*					

SPECIES BY SITE TYPE – SHRUBS

	SITE				
	DRY	FRESH	MOIST	WET	ORGANIC
alder-leaved buckthorn *(Rhamnus alnifolia)*					
beaked hazelnut *(Corylus cornuta)*					
bearberry *(Arctostaphylos uva-ursi)*					
bog birch *(Betula glandulosa; Betula nana)*					
Canada blueberry *(Vaccinium myrtilloides)*					
bracted honeysuckle *(Lonicera involucrata)*					
Canada buffaloberry *(Shepherdia canadensis)*					
chokecherry *(Prunus virginiana* var. *melanocarpa)*					
common juniper *(Juniperus communis)*					
common snowberry *(Symphoricarpos albus)*					
creeping juniper *(Juniperus horizontalis)*					
dry-ground cranberry *(Vaccinium vitis-idaea)*					
dwarf birch *(Betula pumila* var. *glandulifera)*					
dwarf bog-rosemary *(Andromeda polifolia)*					
fly honeysuckle *(Lonicera villosa)*					
green alder *(Alnus crispa; Alnus viridis* ssp. *crispa)*					
high bush-cranberry *(Viburnum trilobum; Viburnum opulus)*					

SPECIES BY SITE TYPE – SHRUBS

	SITE				
	DRY	FRESH	MOIST	WET	ORGANIC
Labrador tea *(Ledum groenlandicum)*				■	■
leatherleaf *(Chamaedaphne calyculata)*					■
low bush-cranberry *(Viburnum edule)*		■			
northern bog-laurel *(Kalmia polifolia)*					■
pin cherry *(Prunus pensylvanica)*					
prickly rose *(Rosa acicularis)*	■	■			
red-osier dogwood *(Cornus stolonifera; Cornus sericea* ssp. *stolonifer)*			■		
river alder *(Alnus tenuifolia; Alnus incana* ssp. *tenuifolia)*					
Saskatoon *(Amelanchier alnifolia)*	■	■			
shrubby cinquefoil *(Potentilla fruticosa; Dasiphora fruticosa* ssp. *floribunda)*					
small bog cranberry *(Oxycoccus micrcarpus; Vaccinium oxycoccos)*					
twining honeysuckle *(Lonicera dioica)*					
wild gooseberry *(Ribes oxyacanthoides)*		■	■		
wild red raspberry *(Rubus idaeus* ssp. *strigosus)*		■	■		
willows *(Salix* spp.*)*			■	■	■

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"Kakithaw-piyak"
Everything is One